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Case No.: 55907US003

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: QIU, ZAI-MING

Application No.: 09/803702

Group Art Unit: 1625

Filed: March 9, 2001

Examiner: Taylor V. Oh

Title: WATER- AND OIL-REPELLENCY IMPARTING URETHANE  
OLIGOMERS COMPRISING PERFLUOROALKYL MOIETIES**BRIEF ON APPEAL**Mail Stop Appeal Briefs-Patents  
Commissioner for Patents  
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| <b>DECEMBER 18 2003</b>  | <i>Hyllis H. Froelke</i>     |
| Date   | Signed by: Hyllis H. Froelke |

Dear Sir:

This is an appeal from the Final Rejection mailed May 21, 2003 (Paper No. 9), finally rejecting claims 1, 2, 4, 6, 9, 10, 14 and 16-18, and the Supplemental Advisory Action mailed July 3, 2002 affirming the rejection of those claims. The Notice of Appeal was filed by facsimile on October 20, 2003<sup>1</sup>. Accordingly, the due date for this Brief on Appeal is Monday, December 22, 2003.

This Brief is being filed in triplicate. The fee required under 37 CFR §1.17(c) for this Appeal should be charged to Deposit Account No. 13-3723.

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<sup>1</sup> Appellants Notice of Appeal should have referred to the finally rejected claims as claims "1, 2, 4, 6, 9, 10, 14 and 16-18".

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**REAL PARTY IN INTEREST**

The real party in interest is 3M Innovative Properties Company of St. Paul, Minnesota.

Application N .: 09/803702Case No.: 55907US003**RELATED APPEALS AND INTERFERENCES**

Appellants, Appellants' legal representative and the assignee are not aware of any appeals or interference proceedings before the U.S. Patent and Trademark Office that will directly affect or be directly affected by or have a bearing on the Board's decision in this Appeal.

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### STATUS OF CLAIMS

Twenty-nine claims were filed with the application. An Office Action containing a restriction requirement was mailed October 2, 2002 (Paper No. 5), modified in a telephonic discussion on October 10, 2002 and memorialized in Appellants' Response to Restriction Requirement filed October 11, 2002. In that Response, Appellants elected claims 1-19. Claims 20-29 were withdrawn from consideration in the Office Action mailed December 27, 2002. No claims have been allowed. However, claims 3, 5, 8, 11-13, 15 and 19 were objected to as being dependent on a rejected base claim and were said in the Final Rejection to be allowable if rewritten in independent form including all limitations of the base claim and any intervening claims. Claim 7 was similarly objected to and said to be allowable if so rewritten. However, claim 7 also remained objected to in the Final Rejection on grounds that it recited structures for the divalent linking group Q in tabular form.

Claims 1-19 are pending in this Appeal. A copy of the appealed claims is reproduced in the Appendix.

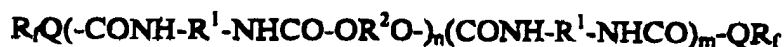
During preparation of this Brief some minor errors were noted in the claims. They are noted below for the convenience of the Board. If this appeal succeeds, Appellants will make the following claim amendments once prosecution resumes:

- amend lines 3-4 of claim 1 to remove the words "compounds or".
- amend claim 2 to recite "The ~~oligomers~~ fluorochemical composition of claim 1 further comprising the reaction product of one or more water-solubilizing compounds comprising one or more water solubilizing groups and at least one electrophilic or nucleophilic moiety, said solubilizing groups independently being pendant from the ~~repeating unit, repeatable unit or the terminal portion group.~~"
- amend the preamble of claims 3, 5-10 and 15 to recite "The fluorochemical composition of claim" 1, 2, 4, 6 or 14 as the case may be.
- amend claim 4 to recite "The ~~oligomers~~ fluorochemical composition of claim 1 further comprising the reaction product of one or more polymerizable compounds comprising one or more polymerizable groups and at least one electrophilic or nucleophilic moiety, said polymerizable groups independently being pendant from the ~~repeating unit, repeatable unit or the terminal portion group.~~"

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- amend line 12 of claim 6 to recite that the  $R^2$  group "is substituted with one or more" of the recited groups.
- amend claim 7 to convert the table of divalent linking groups Q to a list of Q groups.
- amend claim 8 to recite "The oligomers of claim 1 comprising compounds of the Formula:



wherein:

n is a number from 1 to 10 inclusive;

m is 1;

$R_f$  is a perfluoroalkyl group having 1 to 12 carbon atoms, or a perfluoroheteroalkyl group having 3 to about 50 carbon atoms with all perfluorocarbon chains present having 1 to 6;

Q is  $-C_kH_{2k}-OC(O)NH-$  or  $-C_kH_{2k}-NRC(O)NH-$

~~$-C_kH_{2k}-NR^1C(O)NH-$~~  wherein  $R^1$  is H or lower alkyl, and k is an integer from 0 to about 20;

$R^1$  is a straight chain alkylene, of 1 to 14 carbon atoms;

$R^2$  is a polyvalent organic group which is a residue of the ~~polyol~~, that is ~~polyol~~; is a straight or branched chain alkylene, cycloalkylene, arylene or heteroalkylene group of 1 to 14 carbon atoms; and at least a portion of the  $R^2$  groups are substituted with or contain one perfluoroalkyl group, perfluoroheteroalkyl group, perfluoroheteroalkylene group, or mixtures thereof."

- amend claim 13 to recite "The fluorochemical composition of Claim 1 wherein the ~~wherein the~~ fluorine containing group of said polyol is ~~a perfluoroalkyl group of is~~ perfluorobutyl."

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- amend claim 14 to recite "The fluorochemical composition of Claim 1 wherein the monofunctional fluorine-containing compound is a compound of the following formula-I formula:



wherein:

$R_f$  is selected from the group consisting of perfluoroalkyl ~~group groups~~ having 1 to 12 carbon atoms, and perfluoroheteroalkyl ~~group groups~~ having 3 to about 50 carbon atoms with all perfluorocarbon chains present having 6 or fewer carbon atoms;

$Q'$  is ~~a functional~~ a functional group that is reactive with the terminal isocyanate of the polyisocyanate or terminal hydroxy group of the polyol.

- amend claim 16 to recite "The fluorochemical composition of claim 1 wherein said ~~fluorochemical~~ oligomer further comprises the reaction product of one or more non-fluorinated polyols."
- amend claim 19 to recite "The coating composition of claim 18 wherein said mixture comprises ~~and an~~ aqueous solution, dispersion or suspension."
- amend withdrawn claim 22 to recite "The article of Claim 20 wherein the fluorochemical composition further comprises one or more polymerizable groups."

Appellants will also make minor editorial corrections in the written description.

Application No.: 09/803702Case No.: 55907US003**STATUS OF AMENDMENTS**

Appellants amended claims 5, 6, 8 and 10 in their Amendment and Response under 37 CFR §1.111 filed February 26, 2003. Following an in-person interview on July 23, 2003, Appellants attempted to replace claims 1-19 with new claims 30-47 in their Amendment and Response under 37 CFR §1.116 filed July 29, 2003. Entry of this latter Amendment was refused in an Advisory Action mailed August 25, 2003. Following a telephonic interview on September 11, 2003, Appellants submitted a summary of the interview and additional arguments (but no further claim amendments) in an Amendment and Response under 37 CFR §1.116 filed September 12, 2003. The refusal to enter the July 29, 2003 Amendment was sustained in a Supplemental Advisory Action sent to Appellants' agent via facsimile on October 17, 2003. No other amendments adding or canceling any claims have been entered. The claims in the Appendix include all claim amendments made by Appellants.



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### **SUMMARY OF THE INVENTION**

Appellants' invention provides, *inter alia*, fluorochemical urethane compositions comprising fluorine-containing repeatable units and fluorine-containing terminal groups. The compositions can be used, for example, to impart water-repellency and stain-release properties to a variety of substrates (see e.g., page 3, lines 10-28). The compositions appear to impart better water and oil resistance to substrates than compositions containing only pendant perfluorinated groups or only terminal perfluorinated groups (see e.g., the advancing contact angles and receding contact angles data for water and n-hexadecane shown in Examples 1-9 and Comparative Examples C1-C3 at pages 48-50; see also Examples 10-12 and Comparative Examples C4-C5 at pages 53-54). The compositions can contain non-fluorine-containing repeatable units while still providing good advancing and receding contact angles for water and n-hexadecane (see e.g., Examples 17-32 and Comparative Examples C6-C10 at pages 56-58). If the compositions also comprise polymerizable groups, they can provide repellency and stain-resistant treatments having increased durability even after abrasion, scrubbing, washing, exposure to wear and the like (see e.g., page 3, lines 29-32 and Examples 40-44 and Comparative Example C12 at pages 66-67). If the compositions contain water-soluble groups, they can impart surprisingly good water-repellency and stain release properties to substrates including those in which the use of organic solvents is undesirable (see e.g., page 3, lines 20-28), including difficult to treat substances such as limestone (see e.g., Examples 57-60 and Comparative Examples C16-C20 at pages 73-74). Solvent-borne solutions of the fluorochemical compositions permit application of the compositions to a substrate without altering the substrate's appearance (see e.g., page 4, lines 1-6) and can impart good oil repellency to porous substrates such as paper (see e.g., Examples 73-76 at page 80).

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**ISSUE ON APPEAL**

There are no prior art rejections and no rejections under 35 USC §101. The sole issue on appeal<sup>2</sup> is whether it was proper to reject claims 1, 2, 4, 6, 9, 10, 14 and 16-18 under 35 U.S.C. §112, paragraph one<sup>3</sup> for nonenablement.

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<sup>2</sup> Claim 7 was also objected to on grounds (see page 2, lines 7-8 of the Final Rejection and page 3, lines 6-8 of the December 27, 2002 Office Action) that it lists divalent linking groups Q in tabular form. Appellants attempted to overcome this objection in their unentered Amendment and Response under 37 CFR §1.116 filed July 29, 2003, and as noted above will if this appeal is successful amend claim 7 to convert the table of divalent linking groups Q to a list of Q groups. As noted in MPEP §706.01, this objection is reviewable only by way of petition to the Commissioner and is not an issue that would be heard by the Board, and thus will not be discussed further in this Brief on Appeal.

<sup>3</sup> "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention."

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**GROUPING OF CLAIMS**

For purposes of expediting this Appeal and complying with 37 CFR §1.192(c)(7), and without conceding that any of the claims should be similarly grouped in any subsequent appeal or patent infringement litigation, the claims should be considered by the Board according to the following Groups:

- I. Claims 1, 10, 14 and 17
- II. Claims 2, 6 and 18
- III. Claim 4
- IV. Claims 9 and 16

Claim 1 recites fluorochemical compositions. Claim 10 recites certain starting materials for oligomers in such compositions. Claim 14 recites a formula for a monofunctional fluorine-containing starting material for such oligomers. Claim 17 recites a solution of the fluorochemical compositions. For the purposes of this Appeal claims 10, 14 and 17 can be considered with claim 1 and should be considered separately from the claims in Groups II-IV.

Claims 2, 6 and 18 recite water-solubilizing groups. As noted above, fluorochemical compositions containing such groups can impart surprisingly good water-repellency and stain release properties to substrates. For purposes of this Appeal, claims 6 and 18 can be considered with claim 2 and should be considered separately from the claims in Groups I, III and IV.

Claim 4 recites polymerizable groups<sup>4</sup>. As noted above, fluorochemical compositions containing such groups can provide repellency and stain-resistant treatments having increased durability even after abrasion, scrubbing, washing, exposure to wear and the like. For purposes of this Appeal, claim 4 should be considered separately from the claims in Groups I, II and IV.

Claims 9 and 16 recite fluorochemical compositions made from non-fluorinated polyols. As noted above, even though such compositions contain non-fluorine-containing repeatable units they can still provide good advancing and receding contact angles for water and n-hexadecane.

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<sup>4</sup> As does claim 6, but it is already grouped with claim 2

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For purposes of this Appeal, claims 9 and 16 should be considered separately from the claims in Groups I-III.

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**ARGUMENTS OF APPELLANTS**

This Appeal should not have been necessary. The rejected claims are abundantly enabled. The 80 page written description includes extensive definitions at pages 5-8, ample detailed description at pages 8-35, and 76 comprehensive working examples (presented in tabular form to conserve space) at pages 35-80. The December 27, 2002 Office Action concedes that the rejected claims are enabled for many claimed species. The conceded enabled species and alleged nonenabled species are shown below, along with a citation to the rejection in the December 27, 2002 Office Action. The right-hand column of the table cites representative supporting language in the written description for the alleged non-enabled species:

| <b>Conceded Enabled Species</b>   | <b>Alleged Non-Enabled Species</b>        | <b>12/27/2002 Office Action Citation</b> | <b>Exemplary Written Description Support</b>  |
|---|---|--|---|
| "one fluorine-containing repeatable unit, such as perfluoroalkyl, perfluoroalkylene, perfluoroalkyl, and perfluoroheteroalkylene" | "any fluorine-containing repeatable unit" | Page 3, line 10 through page 4, line 2   | Page 13, line 7 through page 15, line 29 and the fluorochemical diols whose preparation is shown at page 38, line 24 (FOSEE) through page 38, line 28<br>$((\text{HOCH}_2\text{CF}_2\text{CF}_2\text{O CF}_2\text{CF}_2)_2\text{CF}_2)$ |
| "one fluorine-containing terminal group, such as perfluoroalkyl and perfluoroheteroalkylene"                                      | "any fluorine-containing terminal group"  | Page 4, lines 3-8                        | Page 18, line 12 to page 22, line 28 and the fluorine-containing compounds whose  |

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| Conceded Enabled Species  | Alleged Non-Enabled Species  | 12/27/2002<br>Office<br>Action<br>Citation        | Exemplary Written<br>Descripti n<br>Support   |
|---|--|---|---|
|   |  |   | source or preparation i<br>shown at page 36, line<br>5 ( $\text{CF}_3\text{CH}_2\text{OH}$ )<br>through page 38, line<br>23 ( $\text{MeFBSE(PCL)}_{4,4}$ )  |
| "fluorinated polyols, such<br>as N-bis(2-<br>hydroxyethyl)perfluoro-<br>butylsulfonamide,<br>fluorinated oxetane<br>polyols, 1,4-bis(1-<br>hydroxy-1,1-<br>dihydroperfluoropropoxy<br>)perfluoro-n-butane, and<br>etc." | "all the fluorinated<br>polyols in the field<br>of chemistry"        | Page 4,<br>lines 9-15                             | Page 8, lines 5-7,<br>Page 13, line 7<br>through page 15, line<br>29 and the<br>fluorochemical diols<br>whose preparation is<br>shown at page 38,<br>line 24 (FOSEE)<br>through page 39, line<br>28<br>$((\text{HOCH}_2\text{CF}_2\text{CF}_2\text{O}$<br>$\text{CF}_2\text{CF}_2)_2\text{CF}_2)$ |
| "polyisocyanates, such as<br>tetramethylene 1,4-<br>diisocyanate,<br>hexamethylene 1,4-<br>diisocyanate,<br>hexamethylene<br>diisocyanate,<br>octamethylene 1,8-<br>diisocyanate, 1, 12-<br>diisocyanatododecane,       | "all the<br>polyisocyanates in<br>the field of organic<br>chemistry" | Page 4,<br>line 16<br>though<br>page 5,<br>line 2 | Page 8, lines 1-4,<br>page 11, line 9<br>through page 13, line<br>6 and the<br>polyisocyanates<br>whose source is<br>described at page 40,<br>line 19 (BDI)<br>through page 41, line<br>8 (N-3400)  |

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| Conceded Enabled Species   | Alleged Non-Enabled Species  | 12/27/2002 Office Action Citation      | Exemplary Written Description Support   |
|--|--|--|---|
| and etc."  |  |  |   |
| "monofunctional fluorine-containing compounds, such as CF <sub>3</sub> O-, CF <sub>3</sub> CF <sub>2</sub> -, CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> -, (CF <sub>3</sub> ) <sub>2</sub> N-, (CF <sub>3</sub> ) <sub>2</sub> CF-, SF <sub>5</sub> CF <sub>2</sub> -, and etc." | "all the monofunctional fluorine-containing compounds in the field of organic chemistry" | Page 5, lines 3-10                     | Page 18, line 12 to page 22, line 28 and the fluorine-containing compounds whose source or preparation is shown at page 36, line 5 (CF <sub>3</sub> CH <sub>2</sub> OH) through page 38, line 23<br>(MeFBSE(PCL) <sub>4.4</sub> ) |
| "water-solubilizing compounds, such as carboxylate, sulfate, sulfonate, phosphonate, ammonium, and quaternary ammonium groups, and etc."   | "all the water-solubilizing compounds in the field of organic chemistry"                 | Page 5, lines 11-17                    | Page 23, line 27 through page 25, line 25 and the compounds listed at page 40, line 9 (MDEOA) through line 17 (bicine)  |
| "polymerizable groups, such as acrylate, methacrylate, vinyl, allyl, glycidyl group, and etc."   | "all the polymerizable groups in the field of organic chemistry"                         | Page 5, line 18 through page 6, line 3 | Page 25, line 26 through page 26, line 3 and the compounds listed at page 41, line 9 (AA) through line 15 (MeFBSEMA)  |
| "an electrophilic or nucleophilic moiety, such   | "all the electrophilic or  | Page 6, lines 4-11                     | Page 8, lines 20-28<br>Page 23, line 27   |

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| Conceded Enabled Species   | Alleged Non-Enabled Species   | 12/27/2002<br>Office<br>Action<br>Citation | Exemplary Written<br>Description<br>Support  |
|--|---|--|--|
| as hydroxy, secondary amino, oxazoliny, oxazolonyl, acetyl, acetonyl, carboxyl, isocyanato, epoxy, aziridiny, thio, and acyl halide, and etc." | nucleophilic moieties in the field of organic chemistry"                |  | through page 26, line 3 and the compounds listed at page 40, line 9 (MDEOA) through line 17 (bicine) and page 41, line 9 (AA) through line 15 (MeFBSEMA)   |
| "a perfluoroalkyl group, such as perfluoropropyl, perfluorobutyl, perfluorooctyl, and etc."  | "all the perfluoroalkyl groups in the field of organic chemistry"       | Page 6, lines 12-18                        | Page 7, lines 13-16; the many perfluoroalkyl groups or perfluoroalkyl group-containing compounds listed at page 9, line 23 ( $R_f$ group definition) through page 41, line 15 (MeFBSEMA); and the working examples |
| "a perfluoroheteroalkyl group, [such as] $CF_3CF_2OCF_2CF_2-$ , $CF_3CF_2O(CF_3CF_2O)_3CF_2CF_2-$ , and etc."                                  | "all the perfluoroheteroalkyl groups in the field of organic chemistry" | Page 6, line 19 through page 7, line 3     | Page 7, lines 20-24; the many perfluoroheteroalkyl groups or perfluoroheteroalkyl group-containing compounds listed at   |



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| Conceded Enabled Species  | Alleged Non-Enabled Species  | 12/27/2002<br>Office Action<br>Citation | Exemplary Written Description Support  |
|---|--|---|--|
|   |  |   | page 9, line 23 ( $R_f$ group definition) through page 41, line 15 (McFBSEMA); and the working examples  |
| <p>"a perfluoroheteroalkylene group, such as <math>-CF_2OCF_2-</math>, <math>CF_2O(CF_2O)_n(CF_2CF_2O)_mCF_2-</math>, and etc."</p> | <p>"all the perfluoroheteroalk-ylene groups in the field of organic chemistry"</p> | <p>Page 7, lines 4-10</p>               | <p>Page 7, lines 25-28; the many perfluoroheteroalkylene groups or perfluoroheteroalkyl-ene group-containing compounds listed at page 10, line 1 (<math>R^2</math> group definition) through page 39, line 28<br/><math>((HOCH_2CF_2CF_2OCF_2CF_2)_2CF_2)</math>; and the working examples</p> |
| <p>"non-fluorinated polyols, such as 1,2-ethanoldiol, 1,2-propanediol, 3-chloro-1,2-propanediol,</p>                                | <p>"all the non-fluorinated polyols in the field of chemistry"</p>                 | <p>Page 7, lines 11-17</p>              | <p>Page 8, lines 5-8; page 15, line 30 through page 18, line 11; and the</p>   |

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| Conceded Enabled Species   | Alleged Non-Enabled Species   | 12/27/2002<br>Office<br>Action<br>Citation         | Exemplary Written<br>Descripti n<br>Support   |
|--|---|--|---|
| and etc."  |   |  | compounds listed at<br>page 39, line 29 (EG)<br>through page 40, line<br>8<br>$((CH_3)_2C(C_6H_4OH)_2)$   |
| "fluorinated<br>monoalcohols, such as 2-<br>N-<br>ethylperfluorobutanesulfo<br>namido)ethanol, 2-N-<br>methylperfluorobutanesul<br>fonamido)ethanol, 2-(N-<br>methylperfluorobutanesul<br>fonamido)propanol and<br>etc." | "all the fluorinated<br>monoalcohols in<br>the field of<br>chemistry" | Page 7,<br>line 18<br>through<br>page 8,<br>line 4 | Page 18, line 12 to<br>page 21, line 8 and<br>the fluorinated<br>monoalcohols whose<br>source or preparation<br>is shown at page 36,<br>line 5 ( $CF_3CH_2OH$ )<br>through page 38, line<br>23<br>$(MeFBSE(PCL)_{4.4})$ |
| "Q as a functional group,<br>[such as] hydroxy,<br>secondary amino,<br>oxazolinyl, oxazolonyl,<br>acetyl, acetonyl,<br>carboxyl, isocyanato,<br>epoxy, aziridinyl, thio,<br>and acyl halide, and etc."                   | "all the functional<br>groups in the field<br>of chemistry"           | Page 8,<br>lines 5-12                              | Page 10, line 21<br>through page 11, line<br>8 and the many Q-<br>group containing<br>compounds listed<br>throughout the<br>remainder of the<br>written description   |

For each of the above alleged non-enabled species, the Office Action also said that:

*"The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to include ["all" or "any" of the alleged non-*

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*enabled species] unrelated to the invention commensurate in scope with these claims. An appropriate correction is required."*

The Office Action concluded by saying that:

*"Furthermore, there are "foreman factors or Wands factors" regarding the presence or absence of working examples because, in the instant case, the claims may encompass numerous variations of fluorochemical urethane compositions which may be used in the making of various coating compositions. However, applicants' specification provide the experimental results showing only 76 examples in the specification. Thus, the specification has failed to provide sufficient working examples to support the formation of many fluorochemical urethane compositions in terms of the broad claimed languages. In addition, more than routine experimentation is required and involved (second foremen factor).*

*"See In re Armbruster 185 USPQ 204 (CCPA 1985) and Angstadt et al, 190 USPQ 152, (CCPA 1990)" (Page 8, line 13 through page 9, line 2)<sup>5</sup>*

The Final Rejection did not add to these arguments.

The Office Action and Final Rejection do not say how much additional disclosure might be required to support claims to the various species alleged not to be adequately enabled. Apparently it was not enough for appellants to submit an 87 page patent application containing "only 76 examples". For example, if the application already concededly supports the divalent linking (Q) groups "hydroxy, secondary amino, oxazolinyl, oxazolonyl, acetyl, acetonyl, carboxyl, isocyanato, epoxy, aziridinyl, thio, and acyl halide, and etc.", one wonders how much additional disclosure might be required to support "all the functional groups in the field of chemistry". Perhaps only a textbook-sized application might suffice.

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<sup>5</sup> The Office Action did not provide case law citations for the relied-upon "foreman factors" and "Wands factors". The citations provided for *In re Armbruster* and *In re Angstadt et al.* both appear to be incorrect. Appellants believe the Office Action was relying on *Application of Forman*, 463 F.2d 1125, 175 USPQ 12 (CCPA 1973), *In re Wands*, 858 F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988), *In re Armbruster*, 512 F.2d 676, 185 USPQ 152 (CCPA 1975) and *In re Angstadt*, 537 F.2d 498, 190 USPQ 214 (CCPA 1976).

The Final Rejection and Office Action entirely fail to meet the standard set by court decisions and the USPTO for assessing enablement and compliance with 35 USC §112, first paragraph. The MPEP summarizes the proper standard for enablement in MPEP §2164. For example, "A patent does not have to teach, and preferably omits, what is well known in the art" (MPEP §2164.01, "Test of Enablement"). Also, "The fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation" (MPEP §2164.01, "Undue Experimentation"). "As long as the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, then the enablement requirement and 35 U.S.C. 112 is satisfied" (see MPEP §2164.01(a), "How to Make the Claimed Invention"). Under the heading "Undue Experimentation Factors", MPEP §2164.01(a) lists eight factors that should be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any unnecessary experimentation is "undue". These factors are:

- (A) The breadth of the claims;
- (B) The nature of the invention;
- (C) The state of the prior art;
- (D) The level of one of ordinary skill;
- (E) The level of predictability in the art;
- (F) The amount of direction provided by the inventor;
- (G) The existence of working examples; and
- (H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The Office Action and Final Rejection allude to at best only a few of these factors and do not discuss them in adequate or even any detail. Appellants' claim breadth is clear (especially in view of the definitions provided in Appellants' written description) and apparently has not been questioned (*viz.*, Factor A above). The invention involves fluorochemical polymers, an established field that already has considerable available prior art, as partly evidenced by the 51 U.S. and foreign patents and 7 literature articles cited in Appellants' Information Disclosure Statement dated May 15, 2001 (*viz.*, Factors B and C above). The level of ordinary skill is relatively high, with participants often having advanced degrees (*viz.*, Factor D above). No

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reasoned evidence has been advanced in the Office Action or Final Rejection that the level of predictability in the fluorochemical polymer art is so low as to make it unlikely that ordinary person could make and use the claimed fluorochemical compositions (*viz.*, Factor E above). The written description contains extensive definitions, ample detailed description including the exemplary written description support passages cited above, and 76 comprehensive working examples (*viz.*, Factors F and G above). No reasoned evidence has been advanced in the Office Action or Final Rejection that an unreasonable quantity of experimentation will be needed to make or use the invention (*viz.*, Factor H above).

MPEP §2164.01(a) also points out that "It is improper to conclude that a disclosure is not enabling based on an analysis of only one of the above factors while ignoring one or more of the others. The examiner's analysis must consider all the evidence related to each of these factors, and any conclusion of nonenablement must be based on the evidence as a whole." Clearly, in this instance the Examiner has not analyzed the required factors and has not met the applicable standard.

Detailed discussion of the applicable case law would unduly prolong this Brief on Appeal and would not materially add to the discussion already set out in the MPEP. Appellants merely note for the record that *In re Wands*, *In re Armbruster* and *In re Angstadt* each found that the rejected claims were enabled and are entirely supportive of Appellants' position. *Application of Forman*, 463 F.2d 1125, 175 USPQ 12 (CCPA 1973) involved claims that improperly relied on sequential selections made by a human operator, a factor not at issue in this Appeal.

Appellants accordingly request that the rejection of claims 1, 2, 4, 6, 9, 10, 14 and 16-18 under 35 U.S.C. §112, first paragraph be reversed.

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**CONCLUSION**

The rejected claims were improperly rejected for nonenablement. The Office Action and Final Rejection do not adequately address the factors for assessing nonenablement as set out in MPEP §2164.01(a). For example, the invention involves an established field that already has considerable available prior art and participants having a relatively high degree of skill. The written description contains extensive definitions, ample detailed description and 76 comprehensive working examples. No reasoned evidence has been advanced that the level of predictability is so low as to make it unlikely that ordinary person could make and use the claimed fluorochemical compositions or that an unreasonable quantity of experimentation will be needed to do so. Appellants thus request that the rejection be reversed.

Respectfully submitted,

Date

Dec 18, 2003

By:

Kent S. Kokko  
Kent S. Kokko, Reg. No.: 33,931  
Telephone No.: (651) 733-3597

Office of Intellectual Property Counsel  
3M Innovative Properties Company  
Facsimile No.: 651-736-3833

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**APPENDIX****Claims on Appeal**

1. (original) Fluorochemical urethane composition comprising:  
one or more oligomers comprising (i) at least one fluorine-containing repeatable unit and (ii) at least one fluorine-containing terminal group, and wherein said compounds or oligomers comprise the condensation reaction product of:
  - (a) one or more fluorinated polyols;
  - (b) one or more polyisocyanates; and
  - (c) one or more monofunctional fluorine-containing compounds comprising one functional group that is reactive with the hydroxyl group of said polyol (a) or with the isocyanate group of the polyisocyanate (b).
2. (original) The oligomers of claim 1 further comprising the reaction product of one or more water-solubilizing compounds comprising one or more water solubilizing groups and at least one electrophilic or nucleophilic moiety, said solubilizing groups independently pendant from the repeating unit, or terminal portion.
3. (original) The water solubilizing compounds of claim 2 wherein said water-solubilizing group is selected from the group consisting of carboxylate, sulfate, sulfonate, phosphonate, ammonium, and quaternary ammonium groups.

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4. (original) The oligomers of claim 1 further comprising the reaction product of one or more polymerizable compounds comprising one or more polymerizable groups and at least one electrophilic or nucleophilic moiety, said polymerizable groups independently pendant from the repeating unit, or terminal portion.

5. (previously presented) The polymerizable compounds of claim 4, wherein said polymerizable groups are selected from the group consisting of acrylate, methacrylate, vinyl, allyl, and glycidyl groups.

6. (previously presented) The compounds of claim 1 having the formula



wherein:

$n$  is a number from 1 to 10, inclusive,

$o$  is a number from 0 to 1, inclusive;

$m$  is a number from 0 to 1, inclusive

$R_f$  is selected from the group consisting of perfluoroalkyl groups having 1 to 12 carbon atoms, and perfluoroheteroalkyl groups having 3 to about 50 carbon atoms;

$Q$  is a divalent linking group;

$R^1$  is a divalent organic group which is the residue of a polyisocyanate;

$R^2$  is a divalent organic group which is a residue of the polyol, at least a portion of which is substituted one or more perfluoroalkyl groups, perfluoroheteroalkyl groups, perfluoroheteroalkylene groups, or mixtures thereof;

$Z$  is  $R_f Q-$ , a water-solubilizing group or a polymerizable group.



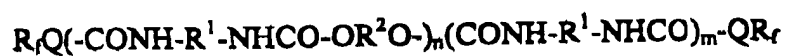
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7. (original) The oligomer of claim 6, wherein Q is selected from the following structures, wherein each k is independently an integer from 0 to about 20,  $R_1'$  is hydrogen, phenyl, or alkyl of 1 to about 4 carbon atoms, and  $R_2'$  is alkyl of 1 to about 20 carbon atoms:

|   |   |
|---|---|
| $-\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$                | $-\text{CONR}_1'(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$                         |
| $-(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$                                       | $-\text{CH}_2\text{CH}(\text{OR}_2')\text{CH}_2\text{O}(\text{O})\text{C}-$         |
| $-(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$                                       | $-(\text{CH}_2)_k\text{SC}(\text{O})-$  |
| $-(\text{CH}_2)_k\text{O}(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$                | $-(\text{CH}_2)_k\text{S}(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$                |
| $-(\text{CH}_2)_k\text{SO}_2(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$             | $-(\text{CH}_2)_k\text{S}(\text{CH}_2)_k\text{OC}(\text{O})-$                       |
| $-(\text{CH}_2)_k\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$ | $-(\text{CH}_2)_k\text{SO}_2-$  |
| $-\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{O}-$                                  | $-\text{SO}_2\text{NR}_1'(\text{CH}_2)_k-$  |
| $-(\text{CH}_2)_k\text{O}(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$                | $-(\text{CH}_2)_k\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$ |
| $-(\text{CH}_2)_k\text{SO}_2(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$             | $-\text{CONR}_1'(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$                         |
| $-(\text{CH}_2)_k\text{S}(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$                | $-\text{CH}_2\text{CH}(\text{OR}_2')\text{CH}_2\text{C}(\text{O})\text{O}-$         |
| $-\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$                | $-(\text{CH}_2)_k\text{O}-$   |
| $-\text{C}_k\text{H}_{2k}-\text{OC}(\text{O})\text{NH}-$                            | $-\text{C}_k\text{H}_{2k}-\text{NR}_1'\text{C}(\text{O})\text{NH}-$                 |
| $-\text{OC}(\text{O})\text{NR}_1'(\text{CH}_2)_k-$                                  | $-(\text{CH}_2)_k\text{NR}_1'-$ and   |
| $-(\text{CH}_2)_k\text{NR}_1'\text{C}(\text{O})\text{O}-$                           |   |

8. (previously presented) The oligomers of claim 1 comprising compounds of the Formula:



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wherein:

$n$  is a number from 1 to 10 inclusive;

$m$  is 1;

$R_f$  is a perfluoroalkyl group having 1 to 12 carbon atoms, or a perfluoroheteroalkyl group having 3 to about 50 carbon atoms with all perfluorocarbon chains present having 1 to 6;

$Q$  is  $-C_kH_{2k}-OC(O)NH-$  or  $-C_kH_{2k}-NRC(O)NH-$ , wherein  $R_1'$  is H or lower alkyl, and  $k$  is an integer from 0 to about 20;

$R^1$  is a straight chain alkylene, of 1 to 14 carbon atoms;

$R^2$  is a polyvalent organic group which is a residue of the polyol, that is a straight or branched chain alkylene, cycloalkylene, arylene or heteroalkylene group of 1 to 14 carbon atoms; at least a portion of  $R^2$  groups are substituted with or contain one perfluoroalkyl group, perfluoroheteroalkyl group, perfluoroheteroalkylene group, or mixtures thereof.

9. (original) The composition of claim 1 wherein the oligomer comprises the condensation reaction product of one or more fluorinated polyols, one or more non-fluorinated polyols, one or more polyisocyanates and one or more monofunctional fluorine-containing compounds.

10. (previously presented) The composition of claim 1 wherein the oligomer comprises the condensation reaction product of one or more fluorinated polyols, an excess amount (relative to the polyol) of one or more linear alkylene diisocyanates, and sufficient fluorinated monoalcohols to react with the terminal isocyanate groups

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11. (original) The fluorochemical composition of Claim 1 wherein the fluorine containing group of said polyol is a perfluoroalkyl group of 1 to 12 carbon atoms.

12. (original) The fluorochemical composition of Claim 1 wherein the fluorine containing group of said polyol is a perfluoroalkyl group of 3 to 5 carbon atoms.

13. (original) The fluorochemical composition of Claim 1 wherein the wherein the fluorine containing group of said polyol is a perfluoroalkyl group of is perfluorobutyl.

14. (original) The fluorochemical composition of Claim 1 wherein the monofunctional fluorine-containing compound is a compound of the following formula I:

$R_f - Q'$

wherein:

$R_f$  is selected from the group consisting of perfluoroalkyl group having 1 to 12 carbon atoms, and perfluoroheteroalkyl group having 3 to about 50 carbon atoms with all perfluorocarbon chains present having 6 or fewer carbon atoms;

$Q'$  is a functional group that is reactive with the terminal isocyanate of the polyisocyanate or terminal hydroxy group of the polyol.

15. (original) The monofunctional fluorine-containing compound of claim 14 wherein  $Q'$  is selected from hydroxyl, secondary amino, oxazoliny, oxazolonyl, acetyl, acetonyl, carboxyl, isocyanato, epoxy, aziridiny, thio, and acyl halide groups.

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16. (original) The fluorochemical composition of claim 1 wherein said fluorochemical oligomer further comprises the reaction product of one or more non-fluorinated polyols.
17. (original) A coating composition comprising a mixture comprising:
- (a) a solvent; and
  - (b) the fluorochemical composition of Claim 1.
18. (original) The coating composition of claim 17 wherein the fluorochemical composition further comprises one or more water-solubilizing groups.
19. (original) The coating composition of claim 18 wherein said mixture comprises and aqueous solution, dispersion or suspension.

Claims 20-29 (withdrawn).

First Named Inventor: QIU, ZAI-MING

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Title: WATER- AND OIL-REPELLENCY IMPARTING  
URETHANE OLIGOMERS COMPRISING  
PERFLUOROALKYL MOIETIES

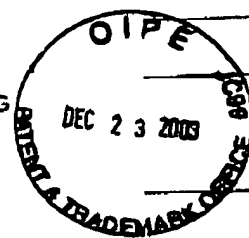
Enclosures:

**Brief on Appeal (in triplicate)**

Amount charged to Deposit Account: **\$320.00**

Attorney (Initials): KSK/hhl

Date: DECEMBER 18, 2003



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